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# APGAR'S

# PLANT ANALYSIS;

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# PREFACE.

STUDENTS in botany should be taught and required to write out brief descriptions of the plants they examine. This is important for the following reasons:

1st. Pupils will thus become familiar with the meaning of botanical terms;

2d. They will learn how to apply these terms in botanical descriptions;

3d. They will distinguish those characteristic features of a plant which are necessary to be known in making the analysis.

4th. The written exercises will afford the teacher an evidence of the work done by the pupils.

The use of the blank schedules, which this book furnishes, will secure a systematic description of the plants analyzed.

The "Analytical Arrangement of Botanical Terms" will be found valuable to the pupil in recalling to mind the terms used in the description of any particular part of a plant.

In order to economize space pupils should abbreviate their descriptions as much as possible.

NOTE.—The signs for feet (°), inches (′), and twelfths (″), should be used in giving dimensions, and the signs for staminate (♂) and pistilate (♀) in the description of imperfect flowers.

# ANALYTICAL ARRANGEMENT

OF

# BOTANICAL TERMS.

## ROOTS.

**Kinds.** — (1.) PRIMARY, growing from root-end of embryo.

(a.) SIMPLE. — *Conical*, ; *napiform*, ; *fusiform*, .

(b.) MULTIPLE. — *Moniliform*,  necklace-like. *Fascicu-lated*,  tufted, thick and fleshy. *Tubercular*,  having small tubers. *Fibrous*,  thread-like.

(2.) SECONDARY, growing from stems.

*Underground*, starting from stem below ground. *Aerial*, starting from stem above ground.

## STEM.

**Parts.** — *n*, *Node*, part to which the leaf is fastened.

*i*, *Internode*, portion between nodes.

*a*, *Axil*, the angle between leaf and stem, upper side.

**Class.** — *Exogenous*, outside-growing (Maple, Elm).

*Endogenous*, inside-growing (Corn-stalk, Timothy).

**Situation.** — (1.) *Above ground*, usually leaf-bearing.

(2.) *Under ground*, scale-bearing.

### Stems above Ground.

**Character.** — *Herbaceous*, soft, not woody (Four-o'clock).

*Suffrutescent*, slightly shrubby (Toad-flax).

*Suffruticous*, shrubby at base (Trailing Arbutus).

*Fruticous*, shrubby (Currant-bushes).

*Arborescent*, tree-like (Flowering Dogwood).

*Arboreous*, tree (Elm).

**Direction of Growth.** — *Repent*,  prostrate and rooting from the under surface (Partridge-berry).

*Procumbent*, prostrate, but not rooting (Purslane).

*Decumbent*,  prostrate, except at the extremity (Poor Man's Weather-glass).

*Assurgent*,  ascending obliquely.

*Erect*, upright (Indian Corn).

*Scandent*,  climbing with tendrils or rootlets (Grape, English Ivy).

*Voluble*,  twining (Morning-glory).

*Declinate*,  declined or bent downwards (Blackberry).

*Diffuse*,  loosely-spreading (Red Currant).

**Forms of Branches.** — *Sucker*,  a branch of subterranean origin that finally rises out of the ground. The Raspberry multiplies in this way.

*Offset*,  a short, prostrate-rooting branch with a tuft of leaves at the end (Houseleek).

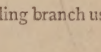
*Runner*,  a long, prostrate-rooting branch with tuft of leaves (Strawberry).

*Stolon*.  a branch that curves downward and takes root. The Currant multiplies in this way.

*Tendril*,  a thread-like coiling branch used for climbing.

*Spine* or *Thorn*,  a hard, sharp-pointed branch.

### Stems under Ground.

**Kinds.** — *Rhizoma* or *Rootstock*,  a perennial, horizontal stem, partially or wholly subterranean (Calamus).

*Tuber*,  an enlarged stem with eyes (White-potato).

*Bulb*,  a bud, usually subterranean with fleshy scales (Onion, Lily).

*Corm*,  a solid bulb (Indian Turnip).

## LEAVES.

**Parts.** —  *b*, *Blade*, the expanded portion.

*p*, *Petiole*, the stem.

*s*, *Stipules*, leaf-like appendages at base of petiole.

**Kinds.** — (1.) SIMPLE,  having but one blade.

*Sessile*,  without petiole.

*Petiolate*,  with petiole.

*Stipulate*,  with stipules.

*Cirrhous*,  with tendril.

(2.) COMPOUND,  having more than one blade.

(a.) *Pinnate*,  with leaflets arranged along a common petiole.

*Abruptly pinnate*,  with even number of leaflets.

*Odd-pinnate*,  having an odd leaflet.

*Unipinnate*,  divided but once.

*Bipinnate*,  divided twice.

*Tripinnate*, divided three times.

(b.) *Palmate*,  leaflets diverging from one point.

*Unipalmate*,  divided but once.

*Bipalmate*,  divided twice.

*Tripalmate*,  divided three times.

**Framework.** — *Midrib*, the central vein.

*Ribs*,  strong veins branching from near the base of midrib.

*Veins*, the branching framework.

*Veinlets*,  small veins.

**Venation.** — *Parallel*,  with simple veins running parallel from base to apex.

*Feather*,  with lateral veins branching at regular intervals from midrib.

*Radiate*,  with strong veins branching from apex of petiole.

*Reticulate*,  with veins and veinlets that unite and separate in the form of network.

**Form.** — (a.) BROADEST AT THE MIDDLE. — *Peltate*, ; *orbicular*,  *oval*, ; *elliptical*, ; *oblong*, ; *linear*, ; *acerose*,  (Pine).

(b.) BROADEST AT BASE. — *Deltoid*, ; *ovate* ; *lanceolate*, ; *subulate*, ; *cordate*, ; *reniform*, ; *hastate*, ; *sagittate*, .

(c.) BROADEST AT THE APEX. — *Obovate*, ; *oblanceolate*,  *spatulate*, ; *cuneate*,  *obcordate*,  *lyrate*, ; *runcinate*, .

**Bases.** — *Auriculate*, ; *oblique*, ; *tapering*, ; *abrupt*, ; *clasping*, ; *perfoliate*, ; *connate*, ; *decurrent*, .

**Apexes.** — *Obcordate*, ; *emarginate*, ; *retuse*,  *truncate*, ; *obtuse*, ; *acute*, ; *acuminate*, ; *mucronate*, ; *cuspidate*, ; *aristate*, .

**Margins.** — *Entire*, ; *repand*, ; *sinuate*,  *crenate*, ; *dentate*, ; *serrate* ; *incised*, ; *laciniate*,  *palmately-lobed*, ; *palmately-cleft*, ; *palmately-parted*, ; *palmately-divided*, ; *pinnately-lobed*, ; *pinnately-cleft*, ; *pinnately-parted*, ; *pinnately-divided*, .

**Surface.** — (a.) WITHOUT HAIRS. — *Glabrous*, smooth.
(b.) SOFT HAIRS. — *Pilous*, few, short; *hirsute*, few, long; *pubéscent*, dense, short; *villous*, dense, long; *seríceous*, silky; *lanūginous*, woolly; *toméntous*, matted like felt; *flóccous*, fleecy tufts.
(c.) STIFF HAIRS. — *Scābrous*, minute, hard points; *hispid*, few, short points; *sētous*, bristly; *spinous*, having spines.

**Color.** — *Glaucous*, covered with whitish powder.
*Canéscent*, grayish-white with fine pubescence.
*Incānous*, hoary-white.
*Punctate*, having transparent dots.
*Hýaline*, nearly transparent.

**Texture.** — *Succulent*, fleshy; *coriaceous*, leather-like; *scarious*, dry; *rúgous*, wrinkled.

**Phyllotaxis,** arrangement on the stem. — *Alternate*, ; *opposite*, ; *whorled* (verticillate); *radical*,  near the ground; *cauline*, on the stem; *rosulate*,  clustered; *fasciculate*,  in bundles.

**Vernation,** arrangement in the bud.
*Induplicate*,  folded crosswise (Tulip-tree).
*Conduplicate*,  folded along midrib (Oak).
*Plicate*,  folded like a fan (Red-currant).
*Circinate*,  rolled lengthwise (Fern).
*Convolute*,  rolled edgewise (Cherry).
*Involute*,  both edges rolled inward (Apple).
*Revolute*,  both edges rolled outward (Willow).
*Equitant*,  astraddle (Iris).
*Obvolute*,  half equitant (Jerusalem Sage).
*Triquētrous*,  triangular equitant (Sedges).

**Duration.** — *Fugacious*, falling very early.
*Deciduous*, falling at the close of the season.
*Persistent*, remaining through the winter.

## INFLORESCENCE.

**Parts.** — *Flower*,  the blossom.
*Peduncle*,  the stem of a solitary flower or the main stem of a flower-cluster.
*Scape*,  a peduncle that grows from the ground.
*Pedicel*, ; *p*, the stem of each flower of a flower-cluster.
*Bracts*, *b*, small floral leaves.
*Involucre*,  a cluster of bracts.

**Kinds.** — (1.) SOLITARY, single, alone.
*Terminal*, at the summit of the stem.
*Axillary*,  in the axils of the leaves.
(2.) CLUSTERED, several flowers collected in a bunch.
(a.) INDEFINITE or INDETERMINATE, flowering from axillary buds. Inflorescence centripetal.

FLOWERS PEDICELLATE.
*Racēme*,  flowers arranged along the axis; pedicels about equal in length (Currant).
*Córymb*,  same as raceme, except that the lower pedicels are elongated, making the top flat (Hawthorn).
*Umbel*,  same as corymb, except that the pedicels branch from about the same point (Milkweed).
*Panicle*,  compound raceme (Blue-grass).
*Thyrsus*, a compact panicle (Lilac).

FLOWERS SESSILE.
*Spike*,  same as raceme with flowers sessile (Mullein).
*Spādix*,  a fleshy spike, generally enveloped by a large bract called a *Spāthe*,  (Calla Lily).
*Ament* or *Catkin*,  a slender pendent spike, with scaly bracts (Birch).
*Head* or *Capitulum*,  a shortened spike, reduced to a globular form (Clover).

(b.) DEFINITE or DETERMINATE, flowers all terminal. Inflorescence centrifugal.
*Cyme*,  flat-topped or rounded inflorescence (Elder).
*Fascicle*, a compact cyme (Sweet-William).
*Glomerule*, a cyme condensed into a head (Mint).
*Verticillaster*,  two opposite glomerules joined (Motherwort).
*Scorpioid*,  a one-sided and coiled cyme (Forget-me-not).

## FLOWER.



**Parts.** — *Receptacle*, the part upon which the several organs of the flower are inserted.

*Calyx*,  the exterior floral envelope.

*Corolla*,  the interior floral envelope. The calyx and corolla constitute the *protecting organs*, sometimes called *perianth*.

*Stamens*,  the fertilizing organs.

*Pistils*,  the seed-bearing organs. The stamens and pistils constitute the *essential organs*.

**Kinds.** — *Symmetrical*,  same number in each set of organs; *unsymmetrical*, different number.

*Complete*,  all the sets present; *incomplete*, some sets wanting.

*Regular*,  sepals and petals uniform; *irregular*,  sepals or petals unlike.

*Perfect*, stamens and pistils both present; *imperfect*, one set absent.

*Staminate*, with stamens only; *pistillate*, with pistils only; *neutral*, with neither.

*Monœcious*, staminate and pistillate on same plant; *diœcious*, on different plants.

*Dichlamýdeous*, having calyx and corolla; *monochlamydeous*, having calyx only; *achlamydeous*, having neither.

*Di*,  *trí*, *tetrá*, *pentá-merous*,  two, three, four, or five parts in each set.

*Sessile*, without peduncle; *pedunculate*,  with peduncle.

DEVIATIONS FROM THE NORMAL OR PATTERN FLOWER ARISE FROM

*Augmentation*, increase of floral circles (Water Lily).

*Chórisis*, increase of organs by division. The Bleeding-heart shows the *collateral chorisis* of stamens, and the Catchfly  shows the *transverse chorisis* of corolla.

*Anteposition*, parts opposite instead of alternate (Grape).

*Cohesion*,  union of parts of the same set (corolla of Morning-glory).

*Adnation*, union of different sets. In the Cherry the stamens and corolla are inserted upon the calyx.

*Irregularity*, parts of the same set unequally developed (Violet, Pea).

*Suppression*, non-development of some parts. In the mints some of the stamens are suppressed or wanting.

## CALYX.

**Parts.** — *Sepals*,  the divisions of the calyx.

*Tube*, the united portion of a gamosepalous calyx.

*Teeth* or *lobes*, the distinct or divided portions of a gamosepalous calyx.

*Throat*, the orifice or summit of the tube.

*Pappus*,  in Compositæ, the calyx border consisting of scales, teeth, bristles, or slender hairs.

**Cohesion.** — *Gamosepalous* or *Monosepalous*,  sepals partially or wholly grown together.

*Truncate*,  without lobes.

*Toothed*,  lobes small.

*Lobed*,  parted about one fourth.

*Cleft*,  parted about one half.

*Parted*,  separated nearly to the base.

*Polysepalous*,  separated to the base.

**Adnation.** — *Inferior*,  calyx free from ovary.

*Half-inferior*,  calyx adherent to the ovary half-way.

*Superior*,  calyx adherent to the ovary.

**Form.** — See under COROLLA.

**Æstivation.** — See under COROLLA.

## COROLLA.

**Parts.** — *Petals*,  the divisions of the corolla.

*Lamina*, the expanded portion of the petal.

*Claw*,  the stem portion of the petal.

*Spur*,  *s*, the hollow portion of certain corollas.

*Crown*,  a small projection from certain petals (Catchfly).

**Cohesion.** — *Gamopetalous* or *Monopetalous*,  petals partially or wholly grown together.

*Truncate*,  *toothed*, *lobed*,  *cleft*, *parted*.

*Polypetalous*,  petals separate.

**Adnation.** — *Hypógynous,*  corolla attached under the pistil (*gynia*, pistil).

*Perígynous,*  corolla attached to the calyx. It is thus around the pistil.

*Epígynous,*  corolla attached to the ovary. It is thus upon the ovary which is a part of the pistil.

**Form.** — GAMOPETALOUS and POLYPETALOUS.

GAMOPETALOUS.

REGULAR.

*Urceolate,*  urn-shaped (Whortleberry).

*Tubular*  cylindrical (Trumpet Honeysuckle).

*Campánulate,*  bell-shaped (Harebell).

*Infundíbular,*  funnel-shaped (Morning-glory).

*Hypocraterimórphous,*  salver-shaped (Phlox).

*Rotate,*  wheel-shaped (Potato).

IRREGULAR.

*Ligulate,*  strap-shaped (Dandelion).

*Lābiate,* two-lipped.

*Gāleate,*  upper lip arched (Catmint).

*Ringent,*  both lips arched (Dead-nettle).

*Personate,*  throat closed (Toad-flax).

POLYPETALOUS.

REGULAR.

*Rosāceous,*  petals without claws (Rose).

*Liliāceous,*  petals with claws gradually spreading (Lily).

*Caryophyllāceous,* long claws enclosed in a tube (Pink).

*Crucíferous,*  four clawed petals in the form of a cross (Mustard).

IRREGULAR.

*Papilionāceous,*  butterfly-shaped (Bean).

PARTS. — *Vexillum,* banner; *alæ,* wings; *carīna,* keel.

**Æstivation,** the arrangement of the floral organs in the bud.

*Valvular,*  pieces met by their margins (Lilac).

*Induplicate,*  margins turned inward (sepals of Clematis).

*Reduplicate,*  margins turned outward (sepals of Hollyhock).

*Convolute,* or *contorted,*  each piece overlaps its neighbor in one direction (Geranium).

*Imbricated,*  one or more petals wholly outside.

*Quincúncial,*  five petals, two without and two within and the remaining one with one edge outside and the other inside.

*Triquētrous,*  three petals, one without and one within, and the remaining one with one edge outside and the other inside.

*Véxillary,*  having one large petal enclosing the others (Pea).

*Plicate,*  the folding of gamopétalous flowers.

*Supervolute,*  with folds turned obliquely in the same direction (Morning-glory).

## STAMENS (ANDRŒCIUM).

**Parts.** —  *Anther,* the enlarged and essential portion.

*Filament,* the stem holding the anther.

*Pollen,* the fertilizing powder found in the anther.

**Kinds.** — *Sessile,*  anther without filament.

*Sterile,* filament without anther.

*Connivent,*  converging.

*Exserted,*  protruding out of corolla.

*Included,* entirely within the corolla.

*Didýnamous,*  four in number, two long and two short.

*Tetradýnamous,*  six in number, four long and two short.

**Cohesion.** — *Syngenesious,*  united by their anthers.

*Monodelphous,* united by their filaments into one set.

*Diadelphous,* united into two sets.

*Polyadelphous,* united into many sets.

**Adnation.** — *Hypógynous*,  borne on the receptacle.

*Perígynous*,  borne on the calyx.

*Epipétalous*, borne on the corolla.

*Alternate*,  alternate with the lobes.

*Opposite*, in front of the lobes.

*Epígynous*, borne on the ovary at its summit.

*Gynándrous*, borne on the style (Orchid).

## FILAMENT.

**Kinds.** — *Filiform*, *subulate*, *dilated*, *petaloid*, *bidentate*.

## ANTHER.

**Parts.** — *Lobes* (*thecæ*) and *connective*.

**Adnation.** — *Innate*,  anther firm on summit of filament.

*Adnate*,  anther attached by its whole length to filament.

*Extrórse*, facing the petals.

*Intrórse*, facing the pistils.

*Versatile*,  attached near the middle.

**Dehiscence.** — *Longitudinal*,  opening lengthwise.

*Transverse*,  opening crosswise.

*Porous*,  opening by terminal holes.

*Valved*,  opening by valves or doors.

## PISTILS (Gynœcium).

**Parts.** —  *Stigma*, the rough end to which the pollen adheres.

*Style*, the stem holding the stigma.

*Ovary*, the enlarged portion containing the ovules.

**Cohesion.** — *Simple*,  having but one cell, placenta style and stigma.

*Multiple*,  a collection of simple pistils (Blackberry).

*Compound*,  simple pistils grown together, each called a *carpel*.

## STIGMA.

**Kinds.** — *Sessile*, stigma on ovary; no style.

*Globose*, globular (Four-o'clock).

*Capitate*,  broad and flat.

*Lobed*, rounded.

*Feathered*, like a feather (Grasses).

*Linear*, thread-like (Corn).

## STYLE.

**Kinds.** — *Basal*, attached to base of ovary (Forget-me-not).

*Lateral*, attached to side of ovary (Strawberry).

*Terminal*,  attached to top of ovary.

## OVARY.

**Parts.** — *Placentæ*, the parts to which the ovules are attached.

*Dissepiments*,  partitions.

*Cells*, cavities in which the ovules are arranged.

*Ovules*, unfertilized seeds.

**Adnation.** — *Inferior*,  calyx adherent to ovary, same as superior calyx.

*Superior*,  calyx free from ovary, same as inferior calyx.

**Placentation.** — *Free-central*,  ovules attached to a central column in a one-celled ovary (Pink).

*Axillary*,  ovules attached to a central column in a compound ovary.

*Parietal*,  ovules attached to the outer walls of the ovary.

## OVULE. 

**Parts.** — *Nucleus*, *n*, the essential part in which the embryo is formed.

*Primine*, *p*, the exterior coat.

*Secundine*, *s*, the interior coat.

*Micropyle*, *m*, the opening of the ovary coats.

*Funiculus*, the stem to which the ovule is attached.

*Hilum*, *h*, the point of attachment on the ovule.

*Chalāza*, *c*, the place where the coverings and nucleus join.

*Rhāphe, r*, the connection between the hilum and the chalaza.

N. B. — Through the funiculus, the rhaphe, and the chalaza the ovule receives its nourishment from the placenta. Through the micropyle it receives the tubular prolongation of the pollen.

**Kinds.** — *Orthótropous*,  straight; no change in direction of parts (Buckwheat).

*Campylótropous*,  curved; the micropyle brought near the chalaza (Bean).

*Anátropous*,  inverted: the micropyle brought near the hilum, pointing to the placentæ. Rhaphe the whole length of the ovule (Magnolia).

*Amphítropous*,  half inverted; short rhaphe (Mallow).

**Direction of Ovary.** — *Erect*,  ; *ascending*,  ; *horizontal*,  ; *pendulous*,  ; *suspended*,  .

## FRUIT.

**Parts.** — *Seed*, the part containing the embryo.

*Pericarp*, the covering of the seeds, including the ovary and all adnate parts. The parts of the pericarp are *epicarp*, or outer coat; *mesocarp*, or middle coat; and *endocarp*, or inner coat.

**Dehiscence.** — *Septicīdal*,  opening of the partitions.

*Loculicīdal*,  opening at the dorsal suture.

*Septífragal*,  valves falling away from partitions.

*Circumcissile*,  opening by a circular horizontal line.

**Kinds.** — *Simple, aggregate, accessory, multiple.*

(1.) Simple Fruits. — *Fleshy, Stone, Dry* (formed by a single pistil).

(a.) Fleshy Fruits. — Indehiscent (with two or more seeds).

Seeds immersed in a pulpy mass.
- *Berry*, rind membranous (Grape).
- *Hesperídium*, rind leathery, separable (Orange).
- *Pēpo*, rind hard (Cucumber).

Seeds in cells. — *Pome*, succulent calyx (Apple).

(b.) Stone Fruits. — Indehiscent; one-celled; endocarp hard.

*Drupe*, three-coated; stone-cell entire (Peach).

*Tryma*, two-coated; stone-cell two-parted (Walnut).

*Etærio*, an aggregation of drupes (Raspberry).

(c.) Dry Fruits. — Indehiscent, usually one seed with one coat.

*Achēnium*,  coat separable from seed (Dandelion).

*Utricle*, coat inflated (Goosefoot).

*Caryópsis*, coat inseparable (Wheat).

*Glans*, invested with a *cūpule*,  (Acorn).

*Samāra*,  having winged appendages (Maple).

(c'.) Dry Fruits. — Dehiscent.

Single pistil.
- *Follicle*,  opening by a ventral suture (Columbine).
- *Legūme*,  opening by both sutures (Bean).
- *Loment*,  jointed legume (Desmodium).

Compound pistil.
- *Capsule*, any compound dehiscent fruit.
- *Sílique*,  a two-valved capsule (Mustard).
- *Sílicle*,  a short silique (Shepherd's Purse).

*Pyxis*,  circumscissile dehiscence (Purslane).

(2.) Aggregate Fruits,  . A cluster of carpels on one receptacle taken as a whole (Raspberry).

(3.) Accessory or Anthocarpous Fruits. — Those of which the most conspicuous portion, although appearing like a pericarp in some cases, does not belong to the pistil (Rose-hip).

(4.) Multiple or Collective Fruits. — Those which result from the aggregation of several flowers into one mass (Pine-apple, Mulberry).

*Stróbile* or *Cone*, a scaly multiple fruit, resulting from the ripening of some kinds of catkins (Hop, Conifers).

*Gálbalus*, a closed cone (Juniper-berry, Red Cedar).

## SEED. 

**Parts.** — *Integuments*, seed-coats. *Nucleus*, part containing the embryo.

(1.) Parts of Integuments:

*Testa* (*episperm*), the outer or proper seed-coat.

*Tegmen* (*endopleura*), the inner coat, sometimes wanting.

*Funículus Hilum* (*h*), *Chalāza* (*c*), *Rhāphe* (*r*), are the same as in ovule.

*Aril*, covering exterior to the integuments (not in the ovule) (May-apple, Water-lily).

*Coma*,  a tuft of hairs on certain seeds (Silkweed).

This is to be distinguished from pappus, which is a tuft on the fruit (Achenium).

(2.) Parts of Nucleus: 

*Embryo* (*e*), the initial plantlet.

*Radicle* (*r*),  the rudimentary stem or first internode.

*Cotylēdon* (*c*), the seed leaf at the primary node.

*Plūmule* (*p*), the growing points above the cotyledons.

*Albūmen* (*a*),  the food for the plantlet's first growth, stored outside the embryo.

**Kinds.**— (1.) General Form: *Orthotropous*, ; *campylótropous*, ; *anátropous*, ; *amphítropous*,  same as in ovule.

(2.) Form of Covering:

*Conformed*, adhering closely to nucleus.

*Cellular*, loose (Pyrola).

*Winged*,  having expanded appendages (Catalpa).

*Woolly*, covered closely with fibers (Cotton).

*Cōmose*,  with coma at the end (Willow Herb).

(3.) Texture of Albumen:

*Farinaceous*, mealy (Wheat).

*Oily*, mealy but mixed with oil (Poppy).

*Mucilāginous*, like mucilage (Morning-glory).

*Ruminated*, wrinkled (Papaw).

(4.) Number of Cotyledons:

*Monocotylédonous*,  (Corn).

*Dicotylédonous*,  (Bean).

*Polycotylédonous*,  (Pine).

(5.) Position and Arrangement of Embryo:

*Eccentric*,  embryo on one side of albumen (Indian Corn).

*Perípheric*,  curved around albumen (Four-o'clock).

*Accumbent*,  applied to the cotyledons when the radicle is bent and lies along their edge (Water-cress).

*Incumbent*,  applied to the cotyledons when the radicle rests against the back of one of them (Shepherd's Purse).

*Conduplicate*,  applied to cotyledons that are incumbent and so folded as to embrace the radicle (Mustard).

(6.) The Direction of the Embryo as respects the Pericarp.

*Ascending*, pointing to the apex.

*Descending*, pointing to the base.

*Centripetal*, pointing to the axis.

*Centrifugal*, pointing to the sides.

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**Stamens.** — Number, cohesion, adnation.
**Anthers.** — Form, cells, dehiscence.
**Pistil.** — Number, parts, cohesion.

**Stigma.** — Number, kind.
**Ovary.** — Adnation, number of cells, placentation.
**Fruit.** — Dehiscence, kind.
**Seeds.** — Number, kind.

*Root* .....

*Stem* .....

*Leaves* .....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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**Remarks.** .....

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**Pistil.** — Number, parts, cohesion.

**Stigma.** — Number, kind.
**Ovary.** — Adnation, number of cells, placentation.
**Fruit.** — Dehiscence, kind.
**Seeds.** — Number, kind.

*Root* .....

*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

ORDER .....

**Name.** { SCIENTIFIC ..... / COMMON ..... }

*Locality* ..... *Date* .....

# ORDER OF DESCRIPTION.

**Root.** — Kind.
**Stem.** — Class, character, direction of growth, height.
**Leaves.** — Arrangement, kind, form, margin.

**Inflorescence.** — Arrangement, kind.
**Calyx.** — Color, form, cohesion, adnation.
**Sepals.** — Number, form, æstivation.
**Corolla.** — Color, form, cohesion, adnation.

*Root* .....

*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

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*Ovary* .....

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*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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*Petals* .....

*Stamens* .....

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*Stem* .....

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*Petals* .....

*Stamens* .....

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*Petals* .....

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*Stigma* .....
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**Remarks.** .....
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**Class** .....

DIVISION .....

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*Leaves* .....

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*Sepals* .....

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*Petals* .....

*Stamens* .....

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*Fruit* .....

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DIVISION .....

ORDER .....

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*Stamens* .....

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*Ovary* .....
*Fruit* .....
*Seeds* .....

**Remarks.** .....
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**Class** .....

DIVISION .....

ORDER .....

**Name.** { SCIENTIFIC ..... / COMMON ..... }

*Locality* ..... *Date* .....

# ORDER OF DESCRIPTION.

**Root.** — Kind.
**Stem.** — Class, character, direction of growth, height.
**Leaves.** — Arrangement, kind, form, margin.
**Inflorescence.** — Arrangement, kind.
**Calyx.** — Color, form, cohesion, adnation.
**Sepals.** — Number, form, æstivation.
**Corolla.** — Color, form, cohesion, adnation.

*Root* .....

*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

ORDER .....

**Name.** { SCIENTIFIC ..... / COMMON ..... }

*Locality* ..... *Date* .....

# ORDER OF DESCRIPTION.

**Petals.** — Number, form, æstivation.
**Stamens.** — Number, cohesion, adnation.
**Anthers.** — Form, cells, dehiscence.
**Pistil.** — Number, parts, cohesion.

**Stigma.** — Number, kind.
**Ovary.** — Adnation, number of cells, placentation.
**Fruit.** — Dehiscence, kind.
**Seeds.** — Number, kind.

*Root* .....

*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

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*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

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*Ovary* .....

*Fruit* .....

*Seeds* .....

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*Stem* .....

*Leaves* .....

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*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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*Stem* .....

*Leaves* .....

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*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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*Sepals* .....

*Corolla* .....

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*Stamens* .....

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*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

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*Ovary* .....

*Fruit* .....

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*Stem* .....

*Leaves* .....

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*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

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*Stigma* .....

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*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

ORDER .....

**Name.** { SCIENTIFIC ..... / COMMON .....

*Locality* ..... *Date* .....

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**Seeds.** — Number, kind.

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*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

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*Stem* .....

*Leaves* .....

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*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

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**Stigma.** — Number, kind.
**Ovary.** — Adnation, number of cells, placentation.
**Fruit.** — Dehiscence, kind.
**Seeds.** — Number, kind.

*Root* .....
*Stem* .....
*Leaves* .....
.....
*Inflorescence* .....
*Calyx* .....
*Sepals* .....
*Corolla* .....
*Petals* .....
*Stamens* .....
*Anthers* .....
*Pistil* .....
*Stigma* .....
*Ovary* .....
*Fruit* .....
*Seeds* .....

**Remarks.** .....
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**Class** .....

DIVISION .....

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**Name.** { SCIENTIFIC .....
COMMON .....

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*Stem* .....

*Leaves* .....

.....

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*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

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**Name.** { SCIENTIFIC ..... / COMMON .....

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*Root* .....

*Stem* .....

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*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

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*Ovary* .....

*Fruit* .....

*Seeds* .....

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*Stem* .....

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*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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*Stem* .....

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*Inflorescence* .....

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*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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*Sepals* .....

*Corolla* .....

*Petals* .....

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*Corolla* .....

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*Sepals* .....

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*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

*Anthers* .....

*Pistil* .....

*Stigma* .....

*Ovary* .....

*Fruit* .....

*Seeds* .....

**Remarks.** .....

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**Class** .....

DIVISION .....

ORDER .....

**Name.** { SCIENTIFIC ..... / COMMON ..... }

*Locality* ..... *Date* .....

# ORDER OF DESCRIPTION.

**Petals.** — Number, form, æstivation.
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**Pistil.** — Number, parts, cohesion.

**Stigma.** — Number, kind.
**Ovary.** — Adnation, number of cells, placentation.
**Fruit.** — Dehiscence, kind.
**Seeds.** — Number, kind.

*Root* .....

*Stem* .....

*Leaves* .....

.....

*Inflorescence* .....

*Calyx* .....

*Sepals* .....

*Corolla* .....

*Petals* .....

*Stamens* .....

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# ORDER OF DESCRIPTION.

**Root.** — Kind.
**Stem.** — Class, character, direction of growth, height.
**Leaves.** — Arrangement, kind, form, margin.

**Inflorescence.** — Arrangement, kind.
**Calyx.** — Color, form, cohesion, adnation.
**Sepals.** — Number, form, æstivation.
**Corolla.** — Color, form, cohesion, adnation.

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*Leaves* .....

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*Sepals* .....

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